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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/741,529	12/19/2000	Quanyuan Shang	005434	6382

32588 7590 01/29/2003

APPLIED MATERIALS, INC.  
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SANTA CLARA, CA 95050

EXAMINER

KORNAKOV, MICHAIL

ART UNIT PAPER NUMBER

1746

DATE MAILED: 01/29/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/741,529

Applicant(s)

SHANG ET AL.

Examiner

Michael Kornakov

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 November 2002.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4, 7-12 and 15 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 and 7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8-12 and 15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> . | 6) <input type="checkbox"/> Other:  |

### DETAILED ACTION

1. Presently amended claims 1-4 and 7 are now directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

If initially presented, claims 1-4 and 7 and claims 8-12 and 15 would have formed two restrictable groups of claims based on the combination/subcombination relationship.

Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the cleaning process utilizing the fluorine cleaning gas does not depend on how and where this cleaning gas was obtained. The subcombination has utility in other combinations, such as producing fluorine for making uranium hexafluoride for isotope separation or producing fluorine for organic and polymer synthesis, for example, to obtain fluorocarbons, such as nonflammable FREON-12, or for making a TEFLON polymer.

Claims 1-4 and 7 are directed to a method of producing a fluorine gas, while claims 8-12 and 15 are directed to a cleaning of semiconductor processing chamber. Initially all the claims were directed to a cleaning process.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 1-4 and 7 are withdrawn from

Art Unit: 1746

consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

2. Applicants' cancellations and amendments have overcome rejections under 35 USC 112, second paragraph, and such rejections are, therefore, withdrawn. Rejections under USC 102 (e) over Dyer (U.S. 6,209,483) and Nowak et al. (U.S. 6,366,346) are withdrawn in view of Applicants' amendment.

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 8-12 and 15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Shang et al. (U.S. 5,788,778) in view of Nicolas (U.S. 5,284,605) and in further views of Karwacki et al (U.S. 5,569,151).

Shang teaches a method of cleaning a deposition chamber that is used in fabricating electronic devices. The method of Shang comprises delivery of reactive gas, such as **fluorine**, into remote plasma chamber, that is outside of the deposition chamber, activating the reactive gas utilizing microwave energy and **flowing the activated reactive gas from the remote chamber into the deposition chamber** to clean the inside of the deposition chamber (see Abstract; col.6, lines 23-29). The teaching of Shang remains silent about the specific steps of obtaining and storing the

Art Unit: 1746

cleaning gas. However, these steps are practically immaterial for the cleaning process per se, unless criticalities of such specific steps are provided.

Fluorine is routinely produced by electrolysis of HF and stored for further use in storage units. The process of separating HF from fluorine containing gaseous mixture by condensing HF is conventionally utilized in order to produce pure fluorine.

Thus, Nicolas teaches that fluorine gas is generally obtained by electrolysis of anhydrous hydrofluoric acid and that produced fluorine may carry some HF, which may be a troublesome impurity in subsequent applications of the fluorine (col.1, lines 17-24). In order to separate HF from fluorine Nicolas refrigerates the gaseous mixture of HF and fluorine, condenses HF into liquid form and, thus obtaining pure fluorine (col. 2, lines 5-22). Karwacki teaches filling, storing and delivery of fluorine to the processing site, utilizing container, which is approved by the Department of Transportation (col.2, lines 44-48; col. 3, lines 52-60).

Therefore a person skilled in the art would have found it obvious to obtain purified fluorine as per teaching of Nicolas and deliver this fluorine to the processing site of Shang in the safe container of Karwacki in order to facilitate the process of Shang with the reasonable expectation of success.

With regard to specific limitation of claim 8, which is concerned with "generating a fluorine cleaning gas **on site** with but remote to the process chamber", a person skilled in the art would have found it obvious to generate or obtain the cleaning gas from the source, which is located as close as possible to the subject to be cleaned in order to cut

Art Unit: 1746

down or eliminate additional expenses related to transportation and distribution of hazardous gaseous materials, such as fluorine gas.

Furthermore, a “new” process can still be obvious when considered as a whole notwithstanding that specific starting materials are not disclosed in the prior art, *In re Durden, Jr.* 226 USPQ 359 (CAFC 1985).

### ***Response to Arguments***

4. Applicant's arguments filed November 4, 2002 have been fully considered but they are not persuasive.

The crux of Applicants argument appears to hinge on the statement, that “Applicants’ invention as recited in amended claim 1...., is to a method of generating a fluorine cleaning gas on site from hydrofluoric acid” (page 11, second paragraph of Applicants’ response). This is not correct, because CONSTRUCTIVELY ELECTED and prosecuted on the merits is the invention drawn to a METHOD OF CLEANING, not to a method of generating fluorine gas. Furthermore, claims amended to recite the method of generating a fluorine gas have been withdrawn from consideration, as discussed *supra*.

With regard to a rejection under 35 USC 103 (a) over the combination of references to Shang et al. (U.S. 5,788,778), Nicolas (U.S. 5,284,605) and Karwacki et al (U.S. 5,569,151), Applicants’ arguments reside in contention that  
a) hindsight is used to combine references;

b) no motivation is found in the teaching of Shang to “limit the method by requiring on site generation of fluorine, as disclosed by Nicolas

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In the instant case the motivation to combine references comes from “three sources: the nature of the problem to be solved, the teaching of the prior art and the knowledge of persons of ordinary skill in the art”, as per *In re Rouffet*, 149 F3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998), namely from the suggestion of Shang that **the activated reactive gas, such as fluorine, is typically used to clean deposits and is supplied from the remote chamber into the deposition chamber to clean the inside of the deposition chamber** (see Abstract; col.6, lines 29-30). Nicolas teaches that fluorine gas is **generally obtained by electrolysis of anhydrous hydrofluoric acid** and that fluorine thus obtained is suitable for various applications. Karwacki teaches filling, storing and delivery of fluorine to the processing site, utilizing container, which is approved by the Department of Transportation (col.2, lines 44-48; col. 3, lines 52-60). Therefore the combination of the above references was made in the instant case based on all three “sources” of motivation.

Furthermore, it is still the Examiner's position that the steps of obtaining fluorine gas, which is further used in a claimed cleaning process are practically immaterial for the cleaning process per se, lacking showing on this record a criticality of fluorine obtained by this particular method for the cleaning process.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (703) 305-0400. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (703) 308-4333. The fax phone numbers for the organization where this application or proceeding is assigned are (703)



Application/Control Number: 09/741,529

Page 8

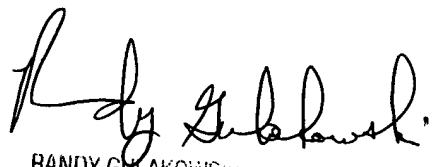
Art Unit: 1746

872 9310 for regular communications and (703) 872 9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 2450.

Michael Kornakov  
Examiner  
Art Unit 1746

MK  
January 23, 2003

  
RANDY GOLAKOWSKI  
SUPERVISORY PATENT EXAMINER  
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